
Battles of the Black Ants.

BY REV. W. P. ALCOTT.

[FROM THE BULLETIN OF THE ESSEX INSTITUTE, VOL. XXIX, 1897.]

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THE wood borings of *Formica Pennsylvanica* L. are often wonderful. Sometimes these insects will form, in a soft pine log, a maze of halls, chambers, corridors, and spiral passages, separated by walls little thicker than paper, and altogether of great architectural beauty and finish.

But attention is now to be called to another line of activity conspicuous in these insects. If investigation of their singular conflicts has been made, it has not happened to attract my notice. The following observations are recorded that they may incite some young Lubbock or McCook to find the cause and purpose of these wars.

On the morning of June 26, 1883, I observed numbers of large black ants wandering excitedly over a back piazza of my house in Boxford, Mass. More careful observation showed a dozen of their dead bodies scattered around, while two living insects were struggling in a desperate conflict. In some places dissevered legs and antennæ were thickly strewn, while in retired nooks living ants were resting, either exhausted, wounded or skulking. I gathered over twenty corpses from the piazza and the ground. Some of these warriors, having mutually in-

flicted mortal wounds, had never relaxed their iron embrace but lay dead in pairs.

The conflict was not yet ended and I watched one of these Homeric encounters. An ant had his antagonist's feeler in his jaws. The combatant, thus held, twisted and turned to get his own mandibles upon feeler, leg, neck or waist of his antagonist. He was, evidently, much unnerved by the other's hold, for these antennæ seem as sensitive as the eyeball, and he was dragged about, resisting and struggling in every way, but all in vain. Finally, the antenna came off near the base and the two warriors parted.

Single combats like this probably went on through the day and a few occurred the following night, for in the morning I found more dead bodies. One wounded soldier died in my custody and many doubtless in cracks and nooks, but the level floor seemed to be the main battle-field. Altogether I collected from the fight about seventy complete bodies or dissevered heads which I preserved in a red pill box—the rather gaudy tumulus of this Waterloo!

In the same place on the morning of July 7, following, I found traces of another battle which was not yet finished. Again, July 19, there had been a battle during the night on the bare floor of a chamber at the opposite end of the house and upstairs. One morning in August, of the same year, I found traces of a similar battle in the cellarway of a neighboring house.

Recurring to the conflict of July 7, I may give from notes made at the time, a more particular description. The ants engaged were evidently workers of the two kinds, having either large heads or small ones—megacephalic or microcephalic. I observed especially a struggle between one of each kind whom I may call for brevity, Meg and Mic, or Mike, abbreviations of the above tech-

nical words. The latter was then alone, all the others being large-headed and seemingly bent on his destruction. But Mike was undaunted and full of fight in spite of being alone among numerous big-headed foes. Indeed, the latter seemed generally afraid to get too near him. At length one of them ventured to clasp jaws, which seems to be the "first hold." Then the two began to bend their tails as if to sting or to inject poison into one another's mouth, an issue which each endeavored to prevent. Other ants attacked Mike, pulling upon his legs and attempting to fasten upon the connection of his abdomen. Meg dragged Mike about, both at times apparently attempting to sting. Mike was dying in half an hour, probably from exhaustion or poison.

Later two dropped from overhead in energetic and deadly conflict—not ceasing under my capture and observation of them. These also were a Meg and a Mike. The former, as before, was stronger, the latter more active and ferocious. He had Meg by an antenna, but Meg pulled him around, Mike keeping his abdomen so curled as to prevent his antagonist's jaws from a fatal grip on his slender waist. Mike had already lost half of one fore-leg and all of a middle one. Meg was minus one entire front leg and was lame in a leg of the next pair, but he was biting vigorously, though in vain, at Mike's hard and polished abdomen. At last Meg's feeler parts where the other has hold and Mike clutches the tip of the remaining feeler. This quickly gives way and he seizes the base, while a small colorless drop exudes from the broken end. Now this antenna parts at the base and, after having fought twenty minutes under my eye and perhaps previously much longer, they separate, the advantage being with Mike. Though confined together, they did not care to fight again. One died during the following night and the other

several days later, perhaps from some abnormal condition of his confinement. Unfortunately, I did not note which died the sooner, but probably it was Meg, who was more injured.

Often since the above observations, I have noticed, about another residence, the corpses left by similar encounters of these ants but I have discovered no additional facts. No similar battles of our other Massachusetts species have ever come under my observation.

Some twelve or fifteen years ago an anonymous correspondent of the St. Louis Republican described a battle of ants in southwestern Missouri. Evidently these were our "black ants." The account tallies so exactly with what I have seen in our own county, that I quote it entire, as follows :

"I am a pedagogue in the rural districts of Newton County, Missouri, and my schoolhouse had been infested for several months by a species of a large black ant, much to the annoyance of the little barefooted scholars, and there seemed to be no way of getting rid of the pest. But what was my astonishment a few mornings since on coming into my school-house, to find the floor literally strewn with dead and dying ants, and upon a closer examination to find that a desperate battle was then raging among them more sanguinary and fatal than any I ever witnessed (and I saw many a hard-fought battle during the late unpleasantness) or read of [in the annals of history]. A much larger number were lying dead than were left engaged, and I therefore concluded the battle had raged all night. Most of the combatants engaged were grappled in a deadly embrace, while others but recently commenced were standing erect on their hind legs, and soaring for the advantage with all the science of the most experienced swordsmen or pugilists. The most fatal point of attack,

and the one for which it seemed all contended, was the ligament which joined the main body with the head. This vital member once seized by the powerful nippers, death succeeded without a struggle, and the victor was ready and eager for another engagement.

No undue advantage was taken by either party ; and no two would endeavor to overpower a single one ; nor was there any flinching or wavering in a single instance, for whenever two belligerents met it was certain death to one or both parties. Never, perhaps, were two armies more equally matched in numbers, strength and valor ; and consequently at the close of the battle, which lasted two nights and a day, as new recruits continued to arrive at every moment, there were but few left, and probably none of the vanquished army, thus rivalling the valor of the heroes of the Alamo and the Spartan band of Leonidas. Observing closely, I could see a slight difference in the appearance of the contestants, one set being perfectly black, with a large head, while the other was nearer brown, with a smaller head, though both about equally matched in size and strength. Dismembered legs were numerous, and many an unfortunate though valiant hero, being entirely deprived of his supporters, was thus left, *hors de combat*, to die on the field. The next morning I swept up the dead and dying of both armies (for I would not disturb them while engaged), amounting to thousands."

In view of the facts given, my own suggestions are now added. That the maiming alone does not always cause the death of these ants is evident. Unless I am greatly in error, experimenters have proved this by clipping off antennæ or legs. Death does not follow for several days at least, and then perhaps from inability to obtain food or drink. Indeed, I observed an ant running about for a long time with his abdomen bitten off or hanging only by

a filament drawn out so that his stomach was upon his shoulders — where perhaps some of us ought to have it ! For all this, the ant was very lively and did not appear to suffer. Again combatants will sometimes die in a few minutes with no wound that a microscope can discover.

It is possible that death is caused by the injection of formic acid, saliva or some other natural secretion into the wounds or mouth. It is admitted, I believe, that animal products take on specially poisonous properties under the influence of rage.

It was astonishing to note the desperation of the encounters. Sometimes others interfere in these dual conflicts as in one case cited above, though this appears exceptional. When two ants grapple it means the death of one or both. Many pairs were found locked in an embrace mutually fatal. Others are seen running around with the dissevered head of an antagonist locked in its final grip upon an antenna or leg. Such a warrior would not loosen his hold though his enemy or some comrade should succeed in his decapitation. The trophy may be "glorious," but it is quite an incumbrance and the bearer tries in vain to secure relief from his ornament.

As to the cause of these battles, I can make no conclusive suggestion. It is, of course, not to be supposed that the insects of the formicary have discovered, as man has, that by such sanguinary conflicts, great questions of ethics and property rights may be settled with infallible exactness !

There is said to be great diversity in the social economy of different species of *Formica*. With some kinds there are battles between rival nests, but I could discover no evidence of this in the cases mentioned. From the impossibility of finding the houses of these wood-borers, my opinion may not be correct. But the slow accumulation of the slain and the insignificance of the numbers at any

one time seen in conflict suggested some other cause than hostile colonies, or a struggle for booty.

Contrary to the Missouri testimony, my pill-box mausoleum shows that the struggles were *not* uniformly between the large-headed and the small-headed ants. Often two of the former or two of the latter are locked in the final clasp. I could discover no rule of difference in size or color.

All these conflicts, I believe, began in the night — usually, if not always, on sultry nights. There may be a kind of craziness, a propensity to "run amuck," which at times seizes a part or all of the workers of a formicary. Some ants were generally recognized as friends, some as enemies. Is it a witchcraft delusion?

My present residence was built in 1770 and early in summer is seriously infested with these insects. Later they are rarely seen in the house. Is it possible that these battles are due to some Malthusian instinct by which, when their services are no longer needed, the great mass of the soldier and worker class slay one another and thus empty the formicary that there may be room and welcome for another generation? Or is there a survival, in this way, of the young and vigorous? Some of the questions suggested can be finally answered only by the carefully recorded observations of many independent and skilful students of nature.